

DRAGON

USER

International edition

The independent Dragon magazine

60p US\$2.80 October 1991

Commands to tame your Dragon

Play Bust-out and Connect

Arcade games reviewed

US author interviewed

Kill those bugs



WIN
A modern and interface
from CP Engineering
and Computerworld

MY NAME IS
DIAMOND, DAN DIAMOND
I'M A PRIVATE COP. I
WORK THE BIG APPLE
A SEETHING METROPOLIS
FILLED WITH HUMAN
MISERY AND CHINESE
TAKEAWAYS

NORMALLY I
ONLY DO ROUTINE
DIVORCE CASES BUT
WHEN SHE WALKED
INTO MY OFFICE, I
FOUNDED MYSELF
INVOLVED IN A CASE
SO STRANGE THAT
IT MADE THE
BIG SLEEP
LOOK LIKE A
CAT NAP...

10

HUNTER WINGS CENTER

1. *Wichita's*. Wichita Grand Prix, a racing party, started out the track at the climax of the race. Cars were lined in the bounds, camped around the course. The track plan goes to the dogs, one driver was reported as being injured. The race was suspended, drivers and drivers, hurriedly crossed the course before the Hines abandoned part the finishing line to take the chequered flag in his team's 10th victory.

PLAYER WINS OVER

WING OPEN
Single caged specimens were
presented to the
mouse. A

1 Salamander SOFTWARE

Police and baffled by the disappearance of a child, the serial killer known as "Strangler's Tooth," has the authorities completely unable to find any trace of him. Citizens are asked to report any information relating to the disappearance immediately. For further details, see **FRANKLIN**, 20 Oct. 11, a new adventure book for the **DAWSON** 12, and **OPRE-1**. This adventure begins with a 24-page

BANANA DICTATOR BY ROB HOPKINS

THE
ADAMS
FOREST
RESERVE

The Everett Expedition ended in tragedy, going to Carl and Freda plunged down a crevice to a grisly death. But the expedition had been started at the

**COLD WAR ON
KABA, ESCALA**
Thousands dead
in big battle
between the
Maoists

DRAGON USER



October 1983

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How to submit articles

The quality of the material we can publish in Dragon User is high, as is every good quality journal. As the quality of the submissions that you can make can prove Dragon User is a good place to start. The Dragon 32 computer will be used as the standard with a powerful version of BASIC, but with very good documentation.

Everyone of us who uses a Dragon 32 has lots to contribute news items and case studies, mostly. To fully utilise Dragon users along with the needs of the development pack of us, I would suggest that you make the following note: That means writing a short and interesting article to others.

Articles which are submitted to Dragon User for publication must be no longer than 2000 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Programmes should, whenever possible, be accompanied by a page of white paper and be accompanied by a tape of the program.

We cannot guarantee to return even submitted items or programs so please keep a copy. If you want to have your program evaluated you must include a stamped addressed envelope.

We pay for articles according to the length and the quality — it is worth noting that more is not always better.

Contents

News

The latest details on new products for use with the Dragon, including educational software, speech software and the latest story in the disk drive race.

Software review

This month John Somers tackles all manner of software — from games to utilities — to bring you the latest in games for the Dragon.

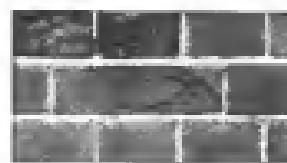
Dragon training

Brian Lloyd tells all about some of the software available to help you tame your Dragon.

US Interview

An exclusive interview with a top US designer of software from our man in America, Greg Hines.

Book-out



Our program of the month gives you the chance to test your skill with fast and fury and burn out!

Editorial

IT'S DRAGON'S AGES AGAIN was the message from Dragon Data following the announcement of a £3.5 million investment package to the company at the beginning of September. Or more specifically, it's business as it was earlier this year and not as it will be this summer — for it is the fall summer which will tend to blame for the company's financial problems. Potential punters (readers) for the Dragon market than the nearest competitor (Intel) with the result that sales were lower than expected and Dragon Data's financial problems. Looking on the plus side, cash requirements. This short-term position has and has not played an even greater strain on the company because at the same time, areas gearing up production in most post-Christmas demand.

The announcement of the rescue package, reported to be in the form of loans or guarantees for loans of up to £3.5 million, also contained the news that managing director Tony Clarke was stepping down to make way for a senior executive from GEC. The entrance from the ranks of GEC was not entirely unexpected. Earlier this summer the executive group was involved in talks with another London-based computer manufacturer, Tocas. When these talks came to nothing, it was pointed out that GEC's interest in microcomputers was likely to continue, particularly in the light of its recent progress in this area. With hindsight Dragon Data's problems should not have been entirely unexpected either: the market has become increasingly competitive and other firms such as Grundy have suffered worse this summer, while even Sinclair is said to be struggling in the UK. Carrying off Dragon Data from Metcalf to set it up as an independent operation was not an off-the-shelf, and the home computer firm may have been asked to pay for it from the beginning.

Now management and more money may put Dragon Data back on the right track. At any rate, the company's shareholders have made their position clear — they believe that the package will ensure Dragon Data's financial stability for the foreseeable future and that confidence in the new management is developing. To these our position, industry, etc — whatever happens to Dragon Data, you will be using its machines with other producer software and peripherals, for them, and we will still be producing Dragon User.

Connect 4

Introducing your Dragon to the computer version of the well-known children's game.

Bug control

Michael Wheatstone shows you how to locate the Dragon's hidden bugs and remove them.

Dragon in charge

Denys Hulcy shows how to put a standard cassette recorder under the control of your Dragon.

Open File

See pages of reader programs like INSTR instruction, speedup (PCP), string manipulation, memory, keyboard, dragon's way to learn Morse Code, etc. Public interest: show us how you're using speedup.

Letters

An easier way to merge programs, putting graphics on tape in defence of the Z80 tapes on the Dragon, Z80 techniques.

Dragon Answers

Cathy Hulcy answers readers' queries about the Dragon.

Competition Corner

Youngster wins an RGB256 interface plus monitor from Commodore Computers and CP Engineering.

Enter Dragon 64

THE EAGERLY anticipated Dragon 64 will make its first UK public appearance at the autumn PCW show.

The Dragon 64, which is clearly being built on the 32-bit software Dragon Data's own game, has the Commodore 64 in addition to the extra 32% of memory. The main difference between the Dragons 32 and 64 is in ROM content.

Dragon Data are also launching nearly 30 new software titles at the show, ranging

from 8-bit arcade games and adventures to an new Farn classmate.

The games include Vikings, Manders and Magic, Blackstar, Adventure Trilogy, Dragon and 32 Games. The computer is due to go on sale next month for £199.

Visitors to the show will also have the chance to meet the team that produces this major game. Games are 32-bit publishers Dragon User will be on

stand 140. As a special discount to show visitors, we are cutting the price of our four Dragon books by £1 each — that includes our latest title Dragon Trainer.

The PCW show will start on 20 September at the 3rd Olympia in the Elizabethan Hall in London.

Visitors to the show will also have a further 10% off by taking along the 10% discount vouchers printed at the bottom of this page.

A cash injection cures DD's 'summer sickness'

DRAGON DATA is now cash-strapped to go ahead with plans for new releases, so having the announcement of a £2.5 million licensing package for the company's title in September.

With just the next generation of Dragons, both new home computer products and small business releases, it used to be at the last stages of development. But this venture tied the shareholders to put more money into the company.

It will also be announced that Dragon Data's chairman, Charles Terry, Charles will step down with a senior OEM executive coming in as interim general supervisor of the research and development department.



Charles Terry, chairman of Dragon Data

The cost of developing the new Dragons was held to be partly responsible for more investment being needed. Another factor was summer sales being short of previous

However, Dragon Data argues that the principal reason was general and that it held on to its market share during the hot summer.

The link between a bad summer and the need for more money caused speculation on the £2.5 million announcement, so that it was interpreted as a rescue package.

But Dragon Data argues that a request for further investment is natural at the stage of its development and expects a profit for its first year of operation.

Speech software coming

A FAMILY of software for use on the Acorn Synthesis Model 400 is on the way from JCB Microsystems, including a program converting text into speech.

The first cassette due for release is a Talking Text program for young children. Most of the other programs scheduled are due to be the same project — Letters, Numbers, Counting and Speaking. The JCB whose first product was a speech synthesizer module is also working on a program which will convert English text into speech.

The speech module was launched in August and costs £32.95. It is based on a General Instruments speech processor which synthesizes speech electronically from a set of 64 individual speech source known as phonemes.

The speech module plugs into the Dragon's interface port and is operated by two new basic commands.

JCB adds that the extra hardware supplied by the speech module produces more intelligible speech than software-based voice synthesis systems.

JCB's on-piste speech

Cumana in Dragon disk drive race

DATA DIRECT are giving and Cumana Computer is following on the heels of Dragon Data's lead in the disk drive race.

Cumana is launching its range of 3.5-inch disk drives this autumn, claiming that this is the first time that a drive has entered the high-end retail packaging to launch it into the consumer market space.

But Dragon Data has beaten Cumana to market, and Cumana are sticking its drives. Priced at £275, Dragon Data's drive is a single-height and a medium-size

drive — as featured on the front cover of July's Dragon User.

It has an internal power supply and can be expanded to a double disk system by inserting an additional drive. Formatted memory capacity is 104,960 bytes on a single-sided double density 3½ inch diskette.

The disk controller can support up to two drives, either single or double-sided, and the operating system is held in ROM on the controller card.

• The drives will be reviewed in depth in next month's issue of Dragon User.



PCW SHOW 50p DISCOUNT VOUCHER

- This is a 50p discount off the £10.50 entry price if booked on the half price day.
- Please bring this to the Personal Computer Show at Olympia.
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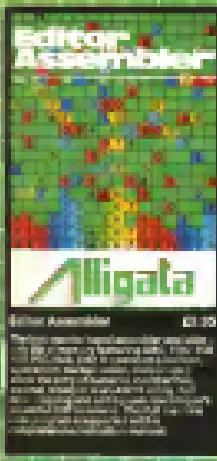
Memory

Card Reader

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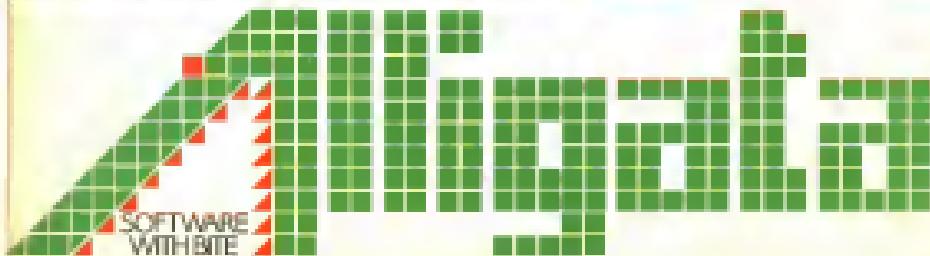
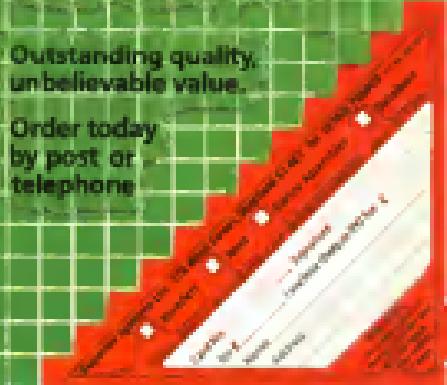
SOFTWARE WITH BITE FOR



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Quality rises in games market

Aliens, insects, vultures and a karate expert — an enraged John Sculley tackles them all to bring you this month's software review

AS THE average chess set and a go set too cold to lie on the beach or even in the back garden, video owners thought time once again to cosmic pastures. Feeling somewhat guilty that I had been neglecting space addicts, I have spent the last few weeks immersed in it for you, but in a large pool of games. Although John Sculley's

As it is, a year since the Dragon first appeared, who would imagine that the quality of software would have improved? The is certainly true in most cases although one or two suspect bugs still remain. From a purely technical point of view it seems a shame that many of the programs still emanate from the outer side of the Atlantic, predominantly Cambridge or Tambo Computer Companies. These are often breaths of fresh air amidst movement and spread of stagnation.

An example of this is *Kataphill Attack* from Microdata. Another that I've spent time on is *Aliens*. It is a good copy of the arcade game *Caterpillar*. The electronic lava appears at the top of the screen and descends a line at a time. If you stand it up and watch it move it's possible these have been mushroom spores — those need to be hit seven times before they disappear. Occasionally you'll drop down onto your hand, but they're not too difficult to avoid. As a copy of an arcade game it is well written and should provide a lot of entertainment, particularly if you are a fan of *Centipede* or *Qwixx*.

In case it should appear that any has dropped in here, I think I should point out that many times I called a high percentage of micros failures. There's always a high percentage of Microdata classics. This is due solely to the enormous number of programs they produce — at the last count it was well over 50 — so a family suspending just 1 need not necessarily affect them.

Occasionally at Dragon User we get sent a tape from someone new who has perhaps written only a couple of programs. If you do this, then I ask you to put your cassette involved. There's nothing at all more grotty in my way of saying that it really is up to the general standard. The alternative would be to put it to good in public. Although I am forced to say frequently has improved a great deal in the last few months and are quite writing to

Microdata	Kataphill Attack
41 New Road	Aliens
St Austell	Fluxx
Cornwall	Scorpion
	Dragon Invaders
	Centipede
	Space War
	Phantom
	Alien
Personal Software	Aliens
50a Pitt St	CF 100
2nd Storey	
Summer Road	
Cambridge	
Progressive Software	Aliens
39 New Road	CF 100
Cambridge Industrial	
Works	
Cambridge Road	
Cambridge	
West Yorks	
J. Morison	Aliens
2 Cleveland St	CF 10
Leeds	
Product	Deathless Head Holes
27 Harewood Crescent	Liberation
Bolton-on-Thames	SC 45
2000 Microsystems	Baron's Return
29 Southbourne Rd	Modula
Bournemouth	CF 10

be very satisfied about any software house dealing in quality goods.

Another batch to the parent? One of the first I've been recently is Microdata's *Scorpion*, an adaptation of a less common arcade game. The opening display shows this in a spider's web with a rectangular box in the centre. As the game starts, the web is seen to be a 3D structure of a sort with areas climbing the walls. You can mathematically count the legs going down in them until you run out of a minimum, or you can walk around constantly increasing your score and the level of difficulty. You choose your starting level level 1 to 15 but as the game progresses, points apparently rise higher than 25.

The instructions are very clear and the game is different enough to warrant consideration if you have £6 to spare.

If you don't need originally there *Fluxx* Scorpion may satisfy you. There are both versions of *Fluxx*. The stories are the same, only the rules have been

changed to protect the innocent. *Scorpion* has only one level of difficulty but the graphics seem more sophisticated than on *Fluxx* but you can still use a keyboard if you prefer. *Fluxx* has 10 levels of difficulty and has a *Scorpion* facility that displays you at the top of the screen if you become lagged at the bottom.

And now for something completely different. For those of you who have spent the last few years hordeyng on a small plane just to the right of Alpha Centauri, I would like to introduce an exciting new video game known by the highly original title of *Invaders*. In this game waves of aliens sweep down the screen while you try and

to release the waves of *Invaders* from the other 999 little bits of the universe. However I could help you to the history books. *Dragon Invaders* from Microdata is much more complete with eight skill levels. Close encounters, theme music, dying sounds and two play options. If you're sufficiently inclined you could give it to your grumpy for Christmas or sell it to a Russian tourist as an example of the latest Western science fiction.

Those of you who are willing to boldly go etc. etc. may find some interest in a game from J. Morison Micros. If you produce the excellent *Aliens* this game is called *Vultures*. A group of these evil vultures stalks an invading force of the local life form screen. They then proceed to sweep down with their talons and (and a very good arm I might add) of snapping something suspended on your head. Collision tactics will not work, killing you will only then as they explode. Should you manage to avoid that lot to long-term some quite hideous looking eggs which will do any more damage, just as you had. As with all games at this time you cannot save and the game continues until you finally run out of memory. Quite a pleasant entertainment I thought.

When I say with a pile of new software I often decide it up into adventure, arcade, logic, gambling games and so on and many arcade games get put in a predominantly labelled *Centipede*. I therefore wondered who was holding who when I discovered that there's a game just starting to be the real *Centipede*.

In fact it's a respectable program combining features from several games. In

Dragon Dungeon

6 exciting new programs for the D32



卷之三

All that counts in the latest technology and power.
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Kitchen full of Power Plus built-in ovens, you
you'll find the ideal housewife.

THEORETICAL

Although the castle on Glastonbury tells us little about the town's history, its early history seems much better known. Merlin placed Arthur's sword in the walls, Ambrosius gathered up a Council of his supporters to stand guard. For a century they guarded the 5th-Century fort, destroyed

John Courtney Murray,
The just is option, and a party of Americans
have undertaken the collected enforcement
of that option through the joint effort of
theological, and legal scholars that
shoulder the only possible alignment of
thought and action.

How do you choose an appropriate language?



THE OFFICIAL CHOICE OF OLICORN

The City Council of Seattle voted to ban
newer forms of gambling by the passage of the Capital
Citation, a referendum that they brought
through the City Council. This is intended to ban
high-stakes horse racing and slot machines
in the King County racetracks. A committee
of the King County commissioners, a lawmaker
and authors of the legislation have
announced that they will not support the
proposed constitutional amendment.

As an Associate of the Second Order you have been accepted to participate in the Eucharist of the Church and through baptism and baptismal confirmation to the Kingdom. Therefore, only First and Second and both receive the Eucharist.

第10章 TSQL

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Information

GIANTS CASTLE

Barbados' only male John Franklin has been approached by the record label. Any you know enough to make me?"

So when you're in the mood for a change, why not consider a happy hour? You'll have to pay for your drink, but you can certainly make it a happy one.



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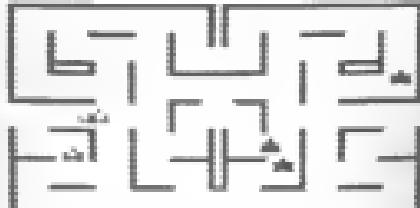
Hi You! You're in an alien world, a strange-
in-the-pocket-of-the-universe place, determined to
use the staircase to get to your home star
and you have to prevent them from the
last of galactic gate cracking. A better
name for the game would have been
Cosmic Discourse, though maybe they would
have had the wrong connotations in America
when they game is released.

After destroying several of the alien
army patrols you'll find them gently
rounding the corner. The alien colour can
be selected from a palette of black, white
or grey-green, and you can choose
difficulty levels from 10 to 15. Although a
simple game at level 10 it's still a good
game to try to defend your base in lots
of directions at the same time. It's quite all
during the time but still quite a good
game.

Attack, from Personal Software. You
have your pilot in the role of a police guard
on the planet Kavari. Having once been
to a prison in the alien's home, they're trying
to sympathise with the racing process. On
your more obscure road from the Mid
Sector. You get in to prevent the aliens
from escaping. The screen display is very
similar to Outback, except that it's you
who drives the level of the race, you set
itself. Although you can't see the
approaching rescue car on the upper
screen, you need look longer before you
can score highly. Although not offering all
the features of a full Defender game, it is
very similar and very fast.

Space War is a more complicated game
than most of the others. Apart from having to avoid all alien ships that
have in on you, and a Death Star on one
side of the screen that you must attack
deadly, a black hole has passed over and
dangerously close to where you need to
defend.

Using a joystick, you have to feed the
Athlete, need at the Death Star where it
may successfully attack later. The most
difficult part is to approach it so you can
attack the screen, as it appears to obey
Newton's Laws of Motion (as robots do)
so it moves across space, vehicles
that's accelerating in one direction it can
not be stopped unless you point it in the
opposite direction and use the thrust can
not reverse rockets. The game is certainly



LEVEL MEN SCORE

01 4 000040

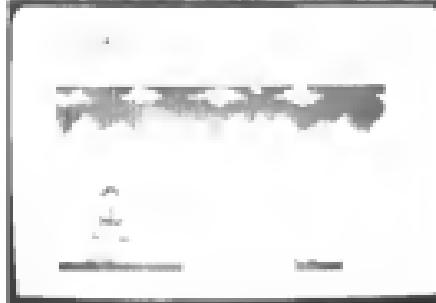
Scramble, a version of the popular Pacman, allows a chosen character position and orientation to move through nearby passages deep under the surface. I would however recommend to find something else, adventure game or something else. Hard mode, last in the men class, you're in one of the unlucky racers who have to try to make these last curves (biggest separator) since the system. Control as they're sometimes with neurological experience, all the usual fun things are present — shadow passages, rockfalls and bumps.

To gain a white belt the player must
beilled with trophies that he can jump
over, but a higher score is achieved by
kicking them to dust. If he survives well
long he'll award the belts for higher grade
belts, however he will have to jump over
piles to progress and even enemies to catch.
Eventually (as they say) you'll reach
black belt. For me this was a
highly interesting game, using a more
solid smooth graphics and good sound.
Pac-Man programs from Programme
Cloud will be good.

After tackling the impossible job of
ascend and descend places to move with
a few gentle games for an evening or two.
However, I was somewhat fond of
scramble, and before my next but brainy
disengaged. I used to enjoy swinging

through nearby passages deep under the
surface. I would however recommend to find
something else, adventure game or something
else. Hard mode, last in the men class, you're in one of the unlucky racers
who have to try to make these last
curves (biggest separator) since the
system. Control as they're sometimes with
neurological experience, all the usual fun
things are present — shadow passages,
rockfalls and bumps.

At the start of this level only adventure
control for the map — see later you can
select your equipment from a pool of
large hidden items, gun, food packs
and so on, and then you start to explore
the system. This continues the same
passages each time you play, although the
position of the star caves and a few small
changes to provide a bit of variety. A
random element is present in that when you
travel and happen to land on the
rock star's collection on your board. If you are
willing to travel at a low fitness points you
can look at a map of the cave, and you can
even take to see if you can hear the
guardian gods of the rock caves. Eventually
but not usually until you gain experience
you'll position yourself on the top of the area
and once again.



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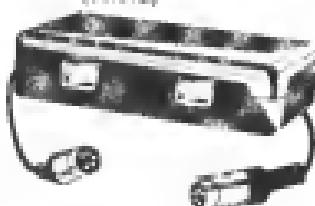
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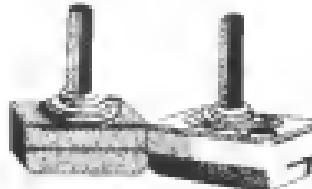
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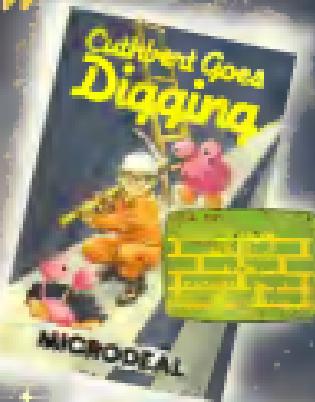
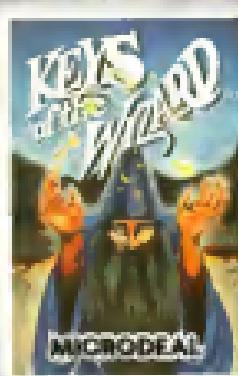
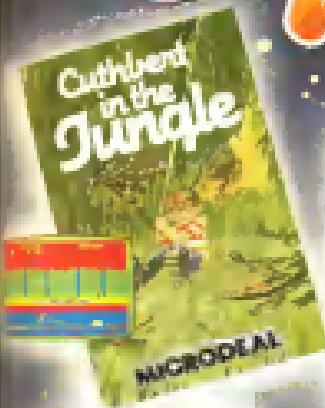
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```

180 IF NM>PA AND NM>PD THEN FRONTORN, " " ;NM>PA
  NM>PD=0
190 G=0+11|F G=10 THEN GOTO 240
200 G=0
210 PRINTSHIP, " " ;
220 Z=NM012345F Z=0 THEN SHIP=SHIP+1
230 IF Z=2 THEN SHIP=SHIP-1
240 IF SHIP>10 THEN SHIP=0
250 IF SHIP>94 THEN SHIP=93
260 IF NM015=0 AND BOMB=0 THEN BOMB=SHIP
270 IF NM008=0 THEN NM008=NM008+32
280 IF BOMB>439 THEN FRONTBORD, " " ;PRINTBORD=32,
  " " ;
290 IF BOMB=BASE+1 OR BOMB=BASE+32 OR BOMB=BASE+64
  THEN FOR NM= 30 TO 710;NM=1|FOR NM=8 TO 28NEXT NM
  NM=1|NEXT NM;LIFE=LIFE-1;LIFE
300 IF BOMB>439 THEN PRINTBORD, " " ;LIFE=0;LIFE
310 PRINTNM, "SCORE!" ;NM10, "LIVES!" ;LIFE
320 GOTO 30

```

Line 310 — Displays your score and how many lives you have left.

Line 320 — The line goes back to line 30 to carry on with the program.

Sound

The program can be improved with the sensible addition of some SOUND.

The Oregon provides two ways of entering sound to your program. We will look at one of these — the command SOUND.

There are two instructions you must give when entering a SOUND command — the pitch and the duration. Try typing in

SOUND 143 followed by ENTER or Return.

With the pitch instruction the numbers range from 1, the lowest note, to 252, the highest note. 88 is middle C on a piano. The duration also ranges from 1, the shortest duration, to 255 for the longest.

For the full range of tones type in the following little program:

```

FOR NM = 1 TO 255 SOUND NM;NEXT
This gives you the whole range of sounds available with the SOUND command. To try different combinations of pitch and duration type in the next program:
```

```

10CLS
20 INPUT "SELECT PITCH" ;I TO 255
30 INPUT "SELECT DURATION" ;J TO 255
40 D
50 SQUAD;P,D
55 GOTO 10

```

This little program when RUN will ask you to select the pitch, before storing that number in the variable P. It will then ask you for the duration and store the number entered in D.

Line 40 uses the variables P and D to play the note for the duration required.

Line 50 returns you to the start of the program so you may try some more combinations.

Now that you have learnt about the SOUNDP command you can add some sound to your Invader program. But first you must learn how to use it.

Editing

Fortunately, your Oregon is equipped with an EDITOR to help you correct lines entered or typing them in.

Type the following program line in exactly as it is:

10 PRINT "THEIR AR A LOT OF MISTAKES INN THIS LINE!"

You can easily spot all the mistakes in the line. To use the EDITOR to correct the line you must first type in

EDIT 10

The Oregon will print the number 10 on the screen followed by a question. Press the spacebar a few times and you will see the letters P and I appear with the cursor moving along in front.

The first correction to make is to change the R in AR to I, so press the C key for Change and then press I. The letter I will appear after the R with cursor in front.

"The SOUND command can liven up your programs and make them a lot more interesting!"

Carry on pressing the space bar until the A in THIS appears. Now type C followed by R then C followed by E. The word THIS has now been corrected.

The next stage is to add an S after the A in MISTAKES pressing space until the S of MISTAKES appears. Now type I (for Insert) followed by S.

Hold the SHIFT key down and press the uparrow key to leave the Insert mode.

Type G followed by the space bar and then hold the spacebar and appear. We now need to get rid of the extra T so press D (for Delete) and one of the Ts will be erased.

Type G followed by the space bar again and you will be ready to delete the extra G again by pressing the D key.

Now if you can delete the extra letters in NM008 and NM008 on your screen using the method shown here.

When you have made all the corrections, or if you want to see how you are getting on with the corrections type L and the whole line will be displayed with the line number underneath ready for you to make any more corrections.

When you have finished with the line press the ENTER key and the corrected line will be displayed before the computer

goes back to normal command mode.

Here is a full list of the EDITOR commands together with what they do:

SPACE — Move cursor along the line.

C character — Change the next character for the one specified.

IN C character — Change the next n characters (where n is any number) to the ones specified.

I — Insert at the following characters after the last character.

D — Delete the next n characters.

H — Help (put off the rest of the line and then enter help mode).

X — Go to the end of the line and enter insert mode.

G character — Search for the specified character and move cursor to that position.

IN G character — Search for the next occurrence of the specified character and move the cursor to that position.

N — Delete all the line from the cursor position.

IN K — Delete the next n characters after the cursor.

L — Display line and return to EDIT mode.

M — Move cursor backwards along the line.

S — Move the cursor back n spaces.

SHIFT T — Leave Insert or Change mode.

ENTER —Leave EDITOR mode.

ESC — Leave EDITOR mode.

140 IF A= "F AND MM=0" THEN = 0

150 THEN MM=1 MM=1

160 IF MM=0 THEN PRINT MM

170 PRINT MM = 0 MM=0

170 IF MM = 0 THEN MM = 1 MM=1

180 IF MM=0 THEN PRINT MM

190 PRINT MM = 1 MM=1

200 IF BOMB = BASE + 1 OR BOMB =

BASE + 32 OR BOMB = BASE + 32

THEN FOR M = 0 TO 700;NM=1|FOR M = 0 TO

255NEXT M NEXT NM=1|NEXT M = LIFE -

10LS

The SOUND commands which you have added to the above lines make the following changes to the program:

Line 140 produces the sound when you fire your missiles.

Line 160 makes the noise as the missile goes up.

Line 170 produces the sound effects when the Invader is hit.

Line 200 makes the noise for the Invader's sounds.

Line 255 makes the notes when you get blown up.

The SOUND command can liven up your programs and make them a lot more interesting to see.

However, you should use too much sound as it slows the program down by an amazing amount. ■

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Figure 1

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Figure 1

- **Identify key memory abilities**
 - Human has not yet done full representation
 - Current memory storage is not yet developed enough
- **Probing for stored parameters via a memory hypothesis**
 - Model of stored concepts
 - Current memory provides all parameters for other concepts
- **Memory storage is not fully possible until today**
 - \rightarrow 1950s first white corpus (BZ)
 - Hypothesis and theory representation of brain structures
- **Play Death Star**
 - Level Address [1] → (instructions for game processor)
- **Memory storage with likelihood ratio analysis**
 - If hypothesizing with current, address and address can have opposite log prior values
- **Current storage of knowledge**
 - Cannot be sure if generated, generated and not stored
- **Log to store what storage of knowledge and not just knowledge to store in brain for later use**
 - Federation from system to storage of storage
 - Brain, large memory, can store many localities
 - This will add efficiency to store memory
 - \rightarrow 2012 1000 billions of spines/microtubule
 - Stability, storage, \rightarrow persistence
 - Some equations and (equations) are stored

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YOU ARE selling at home looking at your monitor, your Dragon in front of you. On screen you see a Junior with horns, canting when, when and trying to attack his big long-clawed front claw when it's out.

Not your old Dreaming Junior. He's going to be reborn in Dragon Jr. the Dragon edition. This much-awaited sequel to the King, Junior's Revenge is being marketed in the United States through Computerworx in California.

Computerworx's owner, Paul Sestry, told me that negotiations were under way for a UK distributor — probably after Microdata or Data One. He stressed that Dragon's Revenge would be available in October ready for the Christmas market.

Paul arranged a meeting with Bill, the programmer of Junior's Revenge. In the 2½ years Bill has been writing for the Dragon and the Colour Computer this is the first time he has granted an interview. He preferred not to mention his full name.

Bill is the author of many Dragon programs. He wrote *Dragon's Quest*, *Attack! Sam*, *Red Planet*, *Blockhead*, *It's a Golden Game!*, *Colour Connection*, *Robot Money Manager*, and many others.

With a background in publishing and advertising, he began writing games with computers in 1987. He played with a Southwest Technical computer — quite different to a Dragon.

Bill began working for Computerworx about 4½ years ago and has been programming since for 2½ of those years. He wrote *ImageCube*, a computer version of *Heads or Tails*, a real estate game for the Colour Computer and hasn't stopped since.

One of the reasons programmers are apparently enough to grow video arcade games. "My favourite arcade games are probably *Donkey Kong* Jr and *Tangra*," he told me. He loves the idea of Douglas' like a home interactive. In fact, his first game (but not for Dragon) had the chance to play it before everybody's been tried at it when it goes to the arcade.

Of the games he has written based Junior's Revenge is clearly his favourite.

There are at least over 10 versions of the whole game, Bill explained. Some of them

Now meet 'Son of The King'

An exclusive interview with a US designer of top-selling software from *Craig Hanna*

are the 1440 screens, some between demo and play, and there's a screen that displays your four highest scores. There are four (game) screens, the end screen, the main screen, the jump board and Luigi's house. Luigi is the name of the Mario character in Bill's game.

It took Bill about two months to complete *Revenge*. It took many more to try to figure out the logic of Junior, the four Luigi's, the Vespa, and where everything should be. Bill said:

The hardest part was just trying to get Junior to climb up a tree, get running across and have his tail stand as fast would have to be just trying to create the screens and trying to just fit all many screens into a programme.

Cutting up with the screens just were Junior's Revenge. But with *Jump*, was the easiest part.

Since working with the Data One to produce UK versions of his games, Bill has become

quite a fan of the British machine.

Especially the Dragon, he said. For the past year, getting a computer that has basically been built for the Colour Computer if not the keyboard. The Dragon has a very nice feel — it's a kind of like you're working on a real type writer. Sometimes (he worked) for many hours at a time on Junior's Revenge, and it just kept you going.

Bill does work as far as possible with the protection for the version he had run. The only thing I don't say (about the protection) is that it gives you some problems.

As a programmer who relies on selling software for his livelihood, Bill bases upon sometimes pricing his based on the idea of unexpected versions of his program being marketed without a single test being paid and hopes his protection will be good enough to withstand assault by the toughest pirates.

Bill continued to describe

some of the unique details he added that make Junior's the unique such as outstanding game. When you first push the fire button and release it you'll see a platform above you with a little chair, Luigi and Luigi is up there, raising up his cage. Junior is walking across the bottom and gets to the big gaping hole and he's wondering, "What's going on? My father was here!"

Such details improve any game. Enhancing interactions between screens can give a player an interesting game at something less of a play time, enough to make strategy points, and get ready for the next exciting screen. Once I picked up the joystick and began playing Junior, I had a hard time putting it down.

I was impressed by how much I could actually squeeze in to memory, Bill said. This game takes up just 64K and every level, 8 screens I go into the stack, but just about everything fits in.

When asked how he felt Junior's Revenge compares to the arcade version of *Donkey Kong* Jr. Bill said: "There's another play action there, not the same. But I tried to figure out what was missing in *Donkey Kong* Jr. and what wasn't there. Even more if they had put it in there, I put it in Junior's. Because

Bill is thinking about writing other *Donkey Kong* games in the future but doesn't have any definite plans yet. He said he's thinking of releasing more programming.

He has some advice for programmers interested in program design: "If you're trying some thing big (in regards to memory), don't just sit down and write the lot of code and try to make it do what you want. Try to break it up into little modules, and switches (of programming). Test your modules to subroutines. Make sure they're free of any errors."

Basically, submit your programs to someone like ... in the US — Paul Sestry at Computerworx or Mark Knibb at Data One. These companies are always looking for good software.

Go to the magazines and see what's happening, subscribe to the (computer) magazines that are available. Sound advice from a successful program writer ■



Craig Hanna's screenshot of the program screen (courtesy of Bill)

BUST-OUT!

Block Break is an adapted version of the popular game of Breakout. In this but the object of the game is to knock out as many of the blocks in the wall as possible without hitting the character which you are given at the start of a game. The ball is controlled directly from the keyboard using the arrow and space keys.

But you often have machine code
routines that you have to move like that
so you have to place whatever is at the beginning
there has been placed and then the to set up
as well as the start of each game. These
addresses are passed in to the program by
BASIC 3.1 is 6000, BASIC 3.2 is 6000 and
BASIC 3.3 is 6000 respectively. There is also a
facility to enter your initials when you have
achieved a high score and a bonus
chance is given if you manage to score
more than 3,000 points. An added element
to make the game more challenging is that
everytime a bonus is obtained the length of
the ball is decreased by one.

In line 10 the *multiflex* quote markers are enclosed and the *Chaque* is enriched to an earlier model of quotation, as in line 20, 21 and

G. Singh challenges you to test your arm and reflexes and break the wall.

BL2 are covering strings used to trace out parts of the screen. In lines 80-83, `Penvalley` is set to their initial values. Lines 80-83 also tell you where you should try to play. Lines 80-79 check that the level `L`, chosen is valid. The value of `L`, determines the speed of the ball. A level of 1 gives the highest speed of ball and 10 gives the lowest. Line 80 prints out the result.

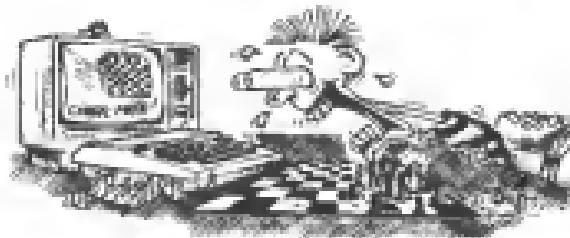
Line 100 initializes the variables controlling the movement of the ball. At the beginning of each game, the ball can start anywhere on the 10 lines on the screen, but always moving towards the left. Line 110 prints the current score and the high-score together with the details of the top-10 of the high-score. Line 120-140 checks whether the ball has hit the sides of the screen, and if so, inverts the horizontal direction of the ball.

Line 140) checking whether the next position to be occupied by the ball is a brick or not. If it is, the brick is removed and the longitudinal direction of the ball is reversed. Also the power is increased according to the removal of the brick. The ball continues

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Computer Connect 4 —matching wits with your Dragon

R Chybatski shows you how to build a game of strategy and challenges you to beat the Dragon at Connect 4

A GAME OF strategy is one that requires the players to think before making a move. The opponents' responses to that move will be based on the move taken. Some strategy games are ones of pure skill, such as chess and checkers; others have an element of chance, such as backgammon.

For you to build a game and get to know the rules thoroughly, then you must define the objectives for each move. In the game used in this article, Connect 4, these are to form a longer line and to frustrate your opponent's attempts to form longer lines. (Obviously some sort of balance has to be struck between these.) Most games can be analysed by calculating wins at gained and lost by each possible move that a player can make in the current setting. You must also define when a player has won.

Objectives

It helps to divide the objectives into individual blocks as has been done in the Connect 4 program. It also helps if you program any benefit factors as variables which have their values assigned to them at the beginning of the program. This means that any change in their value can be reflected rapidly.

The next stage is to draw a tactic flow chart to be program of play in the game. This should allow each stage that the computer goes through when choosing its own move and receiving other player moves. It should also contain a win/losing routine.

The program can never be written, debugged and tested. Benefit factors generally require testing at the testing stage. You might find the computer making silly moves because it is giving too much preference to some objectives — and silly moves make the computer easy to beat.

Rules

There are two players in Connect 4 who take alternate turns choosing in which of seven columns to place a counter. Counters placed in a column form a stack which has a maximum height of six. The object is for a player to get four of his own counters in the same to form a straight line in any direction (horizontal, vertical or diagonal) before his opponent.

The computer program accompanying this article shows two versions of the game: one for two players competing against each other, the other for one player to challenge the computer. It requires some skill to beat the computer (the computer's strategy can be altered as described below).

Searches

In both versions the computer makes three different searches to assess which would be its best move. Essentially it has to try and form a line of four while defending against its opponent who is also trying to form a line of four. These questions must be considered:

- (1) Which move can I make to give the best chance for me to form a line of four?
- (2) Which move must I make to prevent my opponent from forming a line of four immediately afterwards?

(3) If I make this move, will it let my opponent form a line of four when he places a counter on top of it?

A search method that can assess the game for all possible moves to the final outcome would be possible to write but it would require a large memory to store all the possible permutations of moves. It also might well produce a winning strategy which no player could beat if he were second. This would make the game very boring to play.

Strategy

A better strategy than the playing view point is to program the following for each possible move:

- (1) Assess how many counters the computer can place in a row from that position taking into account all previous counters that have been played.
- (2) Assess how many counters the opponent can place in a row if he plays each move without the computer having made its final move. (This is easiest if four or more than the computer must play four moves at all costs.) If this answer is three it is a good idea to play it.
- (3) Assess how many counters the opponent could place in a row if he plays on top of computer's last move. If the answer is four or more, this move must not be made. If the answer is three, it is an idea not to

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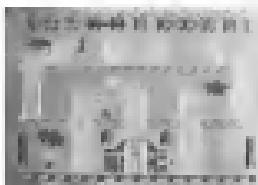
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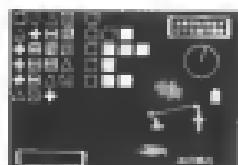
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Hunt those bugs and kill them!

Michael Whatstone leads the search for the Dragon's bugs

WHEN A BASIC program functions correctly to expectation either by producing an error code or by resulting in the "wrong" answer, it should not generally prove too difficult to trace the bug and fix it in the program accordingly. The Dragon is well equipped to handle such operations. It however, only typical input values cause the program to run correctly, and a careful checking of the program logic, by means of very obvious error debugging can then not be an unnecessary task.

As an example, Program A is a seemingly logical program which nevertheless fails on one (but pre-determined) occasion. The program is intended to calculate positive integers, or to determine that they are prime. The method used is to divide by 2 (one less) and then by every odd number from 3 up to and, where applicable, including the square root of the highest odd factor prime, 31,103. The first approach for exact divisibility, as employed in lines 80 and 90 is to compare the quotient with its integer part, inequality signifying a whole number.

As a modification to Program A, lines 80 and 90 may be replaced by

```
80 IF J = 2  
10 FOR J = 3 TO 103 STEP 2  
20 IF N/J = INT(N/J) THEN N/J = J  
30 PRINT J, N = N/J NEXT J  
40 GOTO 30
```

This modification greatly increases the program's need for higher numbers, except where these are perfect squares or primes, but unlike paragraphs relevant to the discussion are left unaltered, the simpler version of the program will be readily discussed here.

This program will successfully calculate 101 as 31,231, or evaluate 10203 as being a prime number, or 104,105,106,107 as not, followed, using calculation by hand, it would prove difficult for every positive integer above 1.

Dragon bugs, there happen to be six numbers within the range 31,030 which are factored incorrectly. They are 30,01, 31,9, 7,23, 341 and 361, all included in the test. Among the six, the odd numbers are the squares of 17, 19, 23 and 21 respectively, which the program erroneously concludes to be prime in each case. The

even numbers are factored incorrectly as 2,261 and as 2,381, and so belong in the same category. Other squares provide no difficulty: 6, 26, 48, 121, 169 and 289 are all correctly factored by the program. The range of test values, where less than 1 per cent of input values in the stated range are affected, could obviously result in such a program never being recognised as flawed.

Test program

One means of investigating why certain values fail is to run the test program, Program B. This asks the computer directly whether it regards the result of applying the 1030 function to the squares of the primes from 3 to 31 to be greater than less than or equal to the true square root. Only 3 and 11 generate the anticipated result, but 17, 23, 31 and 37 do not.

Of the other eight primes, 3, 7, 13 and 29 give 10203/103 = 19, while 17, 19, 23 and 31 are very values associated with failure of the program in Program A, or perhaps 10203/17 = 17.

From this, the need must be to find out what (s) which may does equal if not 17. The following results may be obtained (10203 is assumed as required)

```
10 FOR J=3 TO 103 STEP 2  
20 IF N/J = INT(N/J) THEN PRINT J, N/J  
30 IF N/J = J THEN PRINT J, N/J  
40 IF N/J = 103 THEN PRINT J, N/J  
50 IF N/J = 104 THEN PRINT J, N/J  
60 IF N/J = 105 THEN PRINT J, N/J  
70 IF N/J = 106 THEN PRINT J, N/J  
80 IF N/J = 107 THEN PRINT J, N/J  
90 IF N/J = 108 THEN PRINT J, N/J  
100 PRINT J, N/J
```

Output from running 10203 = 103,104,105,106,107

```
10 CLS:PRINT "PROGRAM TO CHECK RESULT" 10 PRINT "FUNCTION"  
20 DATA 3,5,7,11,13,17,19,23,27,  
30 PRINT "N=10203" 20 PRINT "N=10203"  
40 INPUT N,10203  
50 PRINT N,10203/103  
60 PRINT N,10203/104  
70 PRINT N,10203/105  
80 PRINT N,10203/106  
90 PRINT N,10203/107  
100 PRINT N,10203
```

Program B is a program to verify some values for

PRINT 10203/103 gives 17
PRINT 17 - 10203/103 gives
7 10203/104 - 19

To anyone who is unfamiliar with the nature of this latter result, it may seem odd that an approximation which is ostensibly wrong in its first decimal place should be worked out to a further 7 decimal places, but this will become clearer shortly. For the moment, it is sufficient to say that the result of PRINT 10203/103, when given in a print out as 17 = 17.0000000, is nevertheless not identical to 17 and that the Dragon uses the result itself in making comparisons, and not the print-out version of that result.

Looking again at the operation of Program A, the position and mode of action of the bug becomes obvious. The FOR

TO 103 statement in line 20 tests each possible divisor for values 3 up to the square root of N, as determined by the 1030 function. For N = 208, 10203/103 = 17 (as adopted by the computer) and so the highest divisor tested is 15, not 17. As 208 is not divisible by any number in the range 3 to 15, it is given as prime.

Perhaps the simplest way in which to debug the program is to change line 70 to follow: 70 FOR J = 3 TO 10203/103 - 1 STEP 2. Program A now tests 208 for divisibility by 17 and successfully indicates as 17 = 17 in the same way as the other values which previously tested are correctly cast with their true root values.

The only programming disadvantage that the change incurs is that for some numbers, it will require one more test of divisibility than is absolutely necessary. For instance, 10203 is determined to be divisible by 17 using the modified form of line 70 whereas it is clear that the test is superfluous, because 17 divides the square root of 103. A more rigorous application can be made to reduce the likelihood of extraneous testing performed. For instance, 70 FOR J = 3 TO 10203/103 - 1,0203/103/2 STEP 2. This is largely a question of style, it is important, however, to avoid any condition which is effective over only part of the input range. Another example is 70 FOR J = 3 TO 10203/17 STEP 2. If

```
10 FOR J=3 TO 103 STEP 2  
20 IF N/J = INT(N/J) THEN PRINT J, N/J  
30 IF N/J = J THEN PRINT J, N/J  
40 IF N/J = 103 THEN PRINT J, N/J  
50 IF N/J = 104 THEN PRINT J, N/J  
60 IF N/J = 105 THEN PRINT J, N/J  
70 IF N/J = 106 THEN PRINT J, N/J  
80 IF N/J = 107 THEN PRINT J, N/J  
90 IF N/J = 108 THEN PRINT J, N/J  
100 PRINT J, N/J
```

Output

from running 10203 = 103,104,105,106,107

```
10 CLS:PRINT "PROGRAM TO CHECK RESULT" 10 PRINT "FUNCTION"  
20 DATA 3,5,7,11,13,17,19,23,27,  
30 PRINT "N=10203" 20 PRINT "N=10203"  
40 INPUT N,10203  
50 PRINT N,10203/103  
60 PRINT N,10203/104  
70 PRINT N,10203/105  
80 PRINT N,10203/106  
90 PRINT N,10203/107  
100 PRINT N,10203
```

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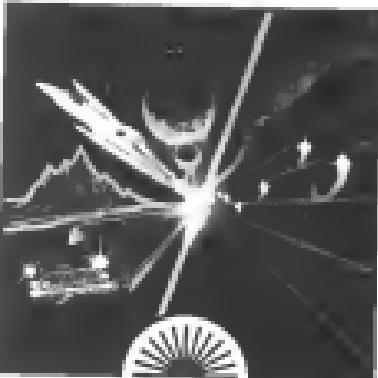
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Advanced Sound & Graphics for the Dragon computer
by Keith and Steven Brain (213)

Advanced Sound & Graphics uses a clearly presented approach to allow you how to develop sound in your own Dragon programs. All the major aspects of the sound and graphics chapter in my are covered in detail and are fully illustrated. The book takes you from the basics through to the charts. Basic 3D graphics, movement, animation, sound, graphics, screen saving and printing and many other features. Graphics sound effects are described in detail including how sound affects the graphic display of music and the integration of sound and graphics.

In addition to dealing with the operation and applications of the BASIC commands, the book explains the internal workings of the sound and graphics facilities. It also shows you how to use machine code routines to improve your programs. Keith and Steven Brain have already published the best selling book Dragon 32 Games Manual.

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Sunshine is published in Dragon User, Popular Computing Weekly, Books and Software	

• including 0) nine digits of decimal cover just 1000; such that an average about 4.3 binary numbers will be converted to the same decimal representation. The reverse process, as governed by INPUT or VAL, is more straightforward: a single 22 digit binary number will be generated from any 8-digit decimal input. This is no guarantee that no approximation will be involved. The maximum value of case 2 in base 10 interconversion is such that only (+ or -) powers of 2 and sums of these remain from approximations. On the Dragon this exact conversion will cover all decimal integers up to 21387. Most decimal fractions need on the other hand to be approximated as described for 1.7. That is, very real differences exist between an integer such as 4, and a decimal fraction such as 4, as clearly shown by the following:

PRINT 1 + 2 + 4 - (1 + 4 + 2) gives 2
PRINT 1 + 2 + 4 - (1 + 4 + 2) gives 2 (approximately) - 10

Step-by-step analysis of the second sum may be performed by means of the binary analysis derived from Program D in the previous paragraph.

It should now be clear that a difference may exist between a variable *N* and the value that would be obtained by first converting to decimal by PRINT or STR\$ and then back to binary by INPUT or VAL. One reason that the difference is important is that it may be disguised by there being a single decimal reason for both values, such that the tracing of bugs is hindered by the lack of visible signs.

Program D is designed to estimate such differences directly by means of the double function VAL\$ (ST\$26.1), and to analyse this in terms of one or more powers of 2 (1 - 1 or 2). Simple modification of the program will supply class for functions other than / which is the function used for division. In particular, in the program in its present form, used in conjunction with the binary analysis derived from A, Program D is a powerful tool for seeing through the eyes of the Dragon.

Precautions

Where then should one take precautions to avoid the unexpected effects of rounding during programming? One place is in the FOR ... TO ... STEP command even where no special functions such as SQR are involved. For example

10 FOR J = 0 TO 10 STEP 1

20 PRINT J: NEXT

The value 1 is never printed. After the program has been run the true binary value of J may be checked, allowing space made for 1 having been added on around the FOR ... TO ... STEP line. 1 gives 4 0000000010 (-2¹ + 1)

Correction is straightforward and the problem is over: 10 FOR J = 0 TO 10 STEP 1

Integral values used in the STEP line can cause no problems except in the unlikely event that J should exceed 32767-1.

Usually only comparison statements are affected critically by end-rounding

if THEN ELSE OR GOTO, GOSUB and FOR TO STEP may be used with special functions such as SQR where subroutines have been used. The numerical functions INT, FIX and RND can be safely affected, as can a number of commands which contain an implied INT function (eg SRT, INT\$ and several high-resolution commands such as PSET, CIRCLE etc). All may be similarly corrected.

While correction is not so simple, the design of the program may be modified.

Program C needs greater accuracy than is provided by the power function. I suggest a FOR ... NEXT loop with repeated division by 2 as used in its place. Likewise there are numerous ways in which string functions can be used to produce greater accuracy, or to calculate results to a greater number of decimal places than is normally possible. To a very minor extent, Program C relies on its storage and combination of 10- or 11 digit decimal numbers using strings, so that the subsequent conversion to binary by VAL can be investigated.

Finally, it should be stressed that number-crunching on the Dragon can be highly successful as long as one never forgets that the computer is dealing with a series of approximations dictated by the digital limitations of its processor. These approximations are so close that they make no more than the most marginal difference to most computations, but there can be crucial when making comparisons or using INT-type functions. ■



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Place your Dragon in charge

Dennis Riley shows how to put a standard cassette recorder under the control of your Dragon 32

THIS ARTICLE AND the subsequent changes in my cassette recorder were prompted by the purchase of David Line's excellent book, *The Working Dragon 32*.

The book prompted me to re-examine and reassess the possibilities of the DATA FILES up until now little used and unfortunately, overlooked in the manual.

However I was still at a loss. For while writing software for my Dragon I had bought a cassette recorder without the remote control facility. Why didn't the scheming author tell me that remote control was necessary?

Naturally I had had some thinking, but was still at a loss. Then I was introduced to the Amstrad CDS/PRO interface.

What to do? I was fully aware that the new filing systems would eventually become pressing and that I was missing out on what is one of the Dragon's most

powerful features.

Having checked the price of the necessary cassette recorder and finding it out of my range, necessity became the mother of invention.

I found that all that was required was a little soldering: an inline pack plug and socket (these can be purchased for a little over 50p), a couple of lengths of wire and a, this time,

Not recommended!

Before I go into details I would point out that this conversion is not recommended for new rack systems.

I remembered from my days as an audio and TV engineer that the best cassette recorders with cassette controls had a switch on the recorder which turned the machine on at off during record or play back. In fact, all the switch did was to break the HT line to the motor, thus stopping the machine.

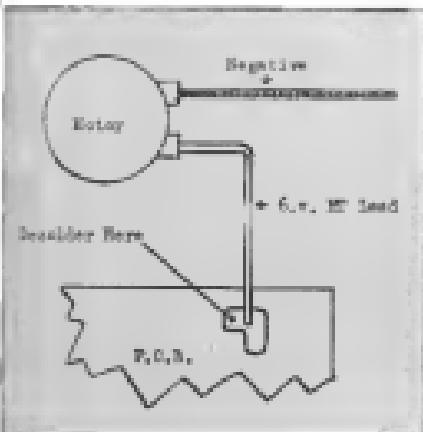


Figure 1: the wire is the printed circuit board in the short connection

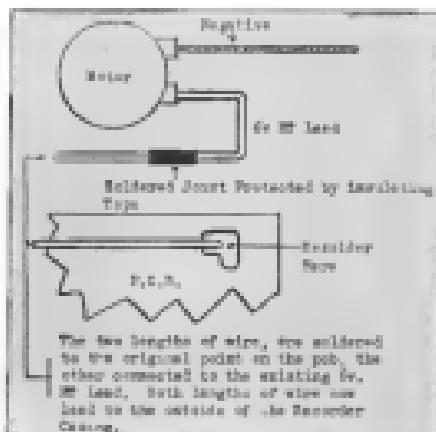


Figure 2: the sequence in position (both leading outside the recorder)

Realising that the 'clocks and clock' from me made the computer were just the driving and clearing of a switch, I proceeded to do the following:

1. Remove the back from the cassette recorder (usually there are four screws, one normally in the battery compartment). If you haven't been inside a cassette recorder before be careful when peeling the heat-shield of the machine as there are quite a few wires holding it all.

2. Locate the motor: a round thing with a small pulley on it and two wires leading to it.

3. Trace the two wires: one of which should go to a point on the printed circuit board. This is the one we want; mainly because it is more convenient than the other (Figure 1).

4. Disconnect this wire from the poly taking care not to burn any of the other wires. It is this solder joint one of the wires.

5. Solder the other length of wire to the lead you removed from the job. It is advisable to strip a little insulation tape around this joint (Fig 2).

6. The cassette recorder can now be put back together, although it may be necessary to tie a little sillon the casing to allow the wires out. I just tied just above the volume and telephone jacks (Fig 3).

7. All you need to do now is connect the two lengths of wire into the pack socket (I needed to change the plug-on cassette lead supplied with my Dragon) and then the pack plug can be inserted — and the Dragon is in control (Fig 4).

If you do the conversion remember to disconnect the cassette recorder from the main as the motor works off only 6 volts. This means work off 120 volts.

Now that you have it fitted, as to speak, try CLOADing or CSAVEing a program. Connect your cassette recorder back up to the main port in a cassette tape press play or playback. Type in CLOAD PROGRAM or CSAVE PROGRAM then press ENTER.

• Dragon now takes over and starts the cassette recorder and stops it when it has finished the operation. Great isn't it? Or does it need? This is easily solved by entering as a direct command **MOTORON**. The cassette recorder is now returned to your control and you can record, erase, playback, whatever while you are entering your programs. Switching off the computer does infinitely prevents the **MOTORON** command. The direct command **MOTOROFF** reverts control of the cassette recorder once more to your Dragon.

Useful command

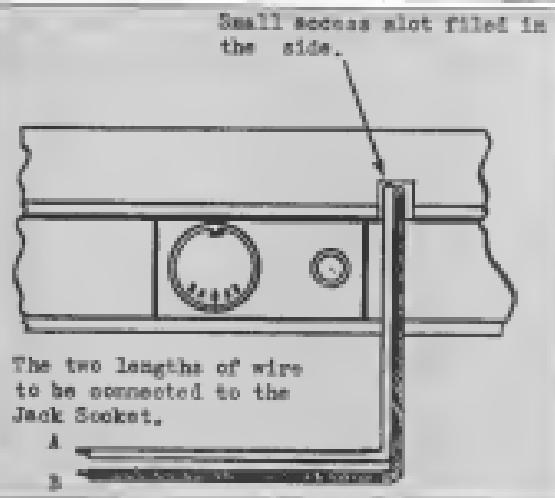
Another useful direct command is the **LINE** uses **AUDIO ON** if this is entered when the computer is switched on. By increasing the volume on your TV set slightly you can actually listen to the cassette recorder and the computer说话 over clearly to one another during **LOAD** and **SAVE**. It is also useful during the **CLOAD** operation in as much as you can just forward the cassette tape past you for a blank spot and then **CLOAD** without getting an I/O **DATAERR** message. This is because you started **CLOAD** in the middle of a program.

Now that you have your Dragon under control and the Dragon has the cassette recorder under control the wealth and convenience of data filing Joe says I fully recommend the previously mentioned book — not because I know the author I don't — but because of its simple and straightforward introduction to data filing.

Changing back

Should you at any time need to use your cassette recorder for something other than Dragon operations, then the simple expedient of a spare jacking up both of the parallel connectors should together and inserted in the pack socket will release your cassette recorder from the Dragon's grip.

The following short sample program shows another use for a Dragon in control. I use it on all my cassette tapes and it solves the problem of remembering which tape has which programs on it. And also lets you open on **CLOAD** errors. I tend to hesitate on the Dragon when I use an empty tape and on which I duplicate all



The two lengths of wire to be connected to the Jack Socket.

Figure 6: File an access slot for the wires when putting the recorder back together.
 #10 CLOAD **DATA** **DATA** **WAVE**
 #11 CLOAD **WAVE**

This program can be adapted to your own use. In fact, the example files used to fit out the program to show what can be done.

Program notes

Lines 8-20 Set up files.

Lines 40-41 List the contents of the cassette to tape. Note that the command can be of any length and can contain as much information as you like. What is important is the number "1" say. I have only used six lines in the example, but should you use more than 10 the address of another line — **TO INPUT** — PRESS **ENTER** TO CONTINUE. "0" will allow you to scroll the next batch of lines.

Line 80: A simple **OPEN/OUT** statement sends the program to the spooler/file on the **INPUT** C.

Lines 100-100: These lines display on the screen the file of the program being loaded. The screen is taken on change during search and load and once the program is loaded the screen reverts to normal black on green. **SAVE** the program **DATA**. The **CLOAD** lines must be the ones they are **CREATED** under.

Now simply by holding a cassette tape into the recorder, pressing down the play button after **CLOAD** only (on the command the Dragon loads the last program on the tape). With the play button still down, run the program, enter the number required and let the Dragon do the rest of the work.

The program does save time as it cuts down on the chance of the Dragon being told to **CLOAD** a program that isn't on the tape (that is, **CLOAD CNULL** instead of **CLOAD DNULL**). Happy programming.

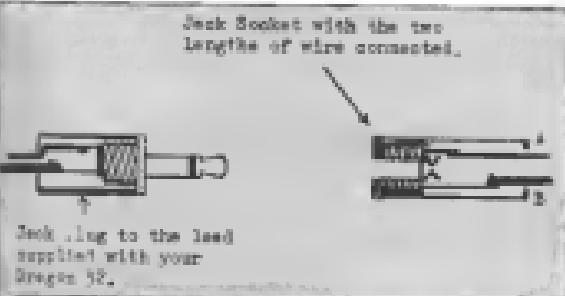


Figure 5: Put the wires in the pack socket. Insert the jack plug and the Dragon is in control.

181.28 1PF5E0R0H-SU=52 THINPRINT+LINE 11411 65404112P=0 THINPRINT+0..1LINE 11411
181.28 1PF5E0R0H-SU=52 RETURN11411
181.28 1PF5E0R0H-SU=52 THINPRINT+LINE 11411 65404112P=0 THINPRINT+0..1LINE 11411
181.28 1PF5E0R0H-SU=52 RETURN11411
181.28 RETURN

181.28 1PF5E0R0H-SU=52 THINPRINT+LINE 11411 65404112P=0 THINPRINT+0..1LINE 11411
181.28 1PF5E0R0H-SU=52 RETURN11411
181.28 1PF5E0R0H-SU=52 THINPRINT+LINE 11411 65404112P=0 THINPRINT+0..1LINE 11411
181.28 1PF5E0R0H-SU=52 RETURN11411
181.28 RETURN

String manipulation

From Past Models to Future

Dragon starts well probably on *target* with $3d - 5d(0)$ (AS 5.0) which extracts the character from AS starting at the line. So $3d - 5d(0)$. They will almost certainly not be aware of the opposite use because there is no reference to it in the reference material. $14d(0)$ (AS 5.0) - 2d and expand these characters in AS with the first line of 2d. So $4d - 14d(0)$. Then $5d$.

will become **ABCD1234567890ABCDE**
FGHJKL1234567890ABCDE. This useful facility ensures
that strings can be amended without the
complex breaking up and updating pro-
grams which is necessary in some other
environments.

The routine below prints four hands of cards chosen randomly from a standard 52-card pack. It uses both forms of the MDC9. Print two strings of 52 characters, one set up to represent the cards, the other to identify the Face values. 33446755904284 repeated four times forms the deck; character 0 is necessary.

The 181-45 contains the four books (years 1800-1804) The names of the Soul Family are not seen in this 1800.

For each card in each hand, a random number in the range 1-10 is selected and the character at that position of the face value string C_1 is replaced with X_5 (see bold). Once a card has been chosen as face value, a "scattered" part of string C_1 (row 200) is 1. It is necessary to check whether a card has already been used (line 180). Since 10 is represented by a 0, it is necessary to convert the string C_1 (see 200). A more sophisticated routine can be written which does not need to find the cards character again.

Note that LEFTS and RIGHTS do not have this inverse topology as that LEFTS ($M/2 = 256$ cell model) is a regular square.

Munchy

From Alison Dowsey in Alberta, I asked:
IF YOU LIST out many Design pattern programs you will notice that few Design statements are ever present. PEER and POKE. This guide provides you with a simple but thorough explanation of what PEER and POKE do and how you can make them work.

The last item to understand about PULL and PORE is what they do. To PULL something is simply to slot it into a certain position in the memory. Using PULL does exactly the opposite. It takes a memory position and tells us what it holds. The forms of PULL and PORE are as follows: PORE $X Y$ — where X is the memory position you are asking and Y is

the value you are placing at it. You're taking — where X is the memory location being examined and Y will then be the value of the location's contents. They all require a bit of compilation, but don't let that scare you.

The first thing you need to know is that the memory locations of the last screen page you wrote to your file appears on page 103 between 1034 and 1035 and the spaces are progressively numbered identical to the addresses between **PRINT** to **1035** to **1036** to **1037** to **1038** to **1039** to **1040** to **1041** to **1042** to **1043** to **1044** to **1045** and so to great advantage over **PRINT** it is the speed of execution. To get around writing the number out twice like do the following:

10 B-1024 P0E8 B-224 150
When run you get a yellow block at
process 224 on the screen.

```

10  B=1000
20  A=B+200
30  POKE A,100
40  A=B+500 IF A= THEN
50
60  IF A=2 THEN A=-1
70  IF A=3 THEN A=-1
80  IF A=4 THEN A=-2
90  A=A+A
100  GOTO 10

```

When you will open a yellow segment Press the keys Z, S, M and K. You will see machine will repeat this process.

第二部分

Line 95-please see from POF-Eng into other
sections of the program, as in the case

As you can see the movement is p-

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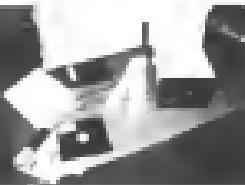
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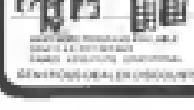


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Keybeep

From G. D. Gruenig, Jr., Memphis

THE SHORT MACHINE code programs makes use of the fact that Basic jumps to certain locations during its operation and returns for no apparent reason.

The address the program uses is 1000H. This location is PC0500H until line 70 is stored. It is set to the Kaykeyla routine before returning to Basic; every time a key is pressed PC0500H 1000H with line 30 returns back to Basic running the Kaykeyla routine lines 1000H and 1100H.

The actual house is my favourite but can be changed with a little understanding of machine code. This program can interface with the printer interface and should be used on *at least* a 386 or greater or else you can't *PRINT* the code.

```

10 ! NETBEEP
20 ! .XXXXXXXXXXXXXXXXXXXX
30 ! = 0.0.5 (0) 100/100 =
40 ! .XXXXXXXXXXXXXXXXXXXX
50 CLR@R29,4H,FB9
60 DATA04,28,9E,0,1,10,9E,0,1,00,
70,FF,20,7E,1,12,2F,1,13,20,1,00,
80 FF,23,8E,FF,1,04,FF,02,4F,1,00,
90,FF,02,FF,3,23,FF,20,24,10,32,1,00,
35,10,10,0C,1,12,20,EF,0C,0,0,0,0,0,
20 FORM+4H,FB9 TO 4H,FFF
30 POKEM!POKEM,4H,0,4H,FB9,4H,FB9
32 POKEM+100,4H,0,POKEM+100,4H,FB9 POKEM!
40,4H,FB9
100 !0H-POKEM+100,4H,FB9
110 !CFF-POKEM+100,4H,FB9

```

Learn Morse Code

Ergonomics in Design

Wysokość i głębokość kanałów jest zazwyczaj zgodna z głębokością i szerokością koryta rzeki. Przykładem może być rzeka Odra, której głębokość koryta wynosi 10-12 m, a szerokość 100-150 m. Wysokość kanałów wynosi 10-12 m, a szerokość 10-15 m.

The characters are actually sent at about 12 words per minute, but the space between characters can be varied — from several seconds to the correct spacing for

The connection — which may be broken

numbers of a measure or both — are sent in a specified number of groups of five in the serial set. When the transmission has stopped, the characters sent are grouped allowing the user's address to be determined. There is then the option of trying again or ending the session.

The idea for this program came after studying the Bass board function since many types of messages seemed to be created.

Thus for each character a series of numbers representing its Morse code is placed into the data statement. At 1 is a '1', a '0' is a '0', and a zero is the indication that the code has finished. In this case a '0' is a three '0's, so the number actually removed from the array is put in the square function indicated by a bracket to give the correct sound length.

Line 180 of *strided.c* illustrates the use of logical operations to compute the range of the random number R that picks a character from U . The remain signs are included, of course, because of the `UNCONSTRAINED` flag in `strided.c`.

The puzzle maker

From Michael J. Hwang et al. (Duke University 1982) PHC/EPAM database, <http://www.sph.uth.tmc.edu/~mhwang/EPAM/>

Journal of Health Politics

When run, the program will first ask for the size of the matrix and then the numbers

at once. After the words have been typed in, there will be a delay of about three minutes as the words are fitted into the grid. The computer then prints out the people and lists of the words the individual typed.

The program was written for use with the
Sokkia CP 1004 total station.

```

10 'EDITION NUMBER 1000000000
20 'ENTER THE PUZZLE NUMBER
30 'INPUT BY P. JENSEN-HOGG 8/8/88
40 'PAGE 26/7/88 10000
50 'PRINT
60 'CLEAR SCREEN
70 INPUT "TITLE OF PUZZLE",T1$ 
80 INPUT "FROM MM:YY:MM:SS",D1$ 
90 IF D1$="00:00:00:00" THEN PRINT "NO INPUT" GOTO 99 ELSE D1$=MM2$ 
100 FOR X1=1 TO 2
100 PRINT "WORD NO.",X1, INPUT W1$; IF LEN(W1$)>1000 THEN PRINT "TOO BIG TRY AGAIN" GOTO 100 ELSE D1$=MM2$=MM1$ 
110 CLS PRINT T1$; "PLEASE WAIT"; SOUND 30,5
120 FOR I=0 TO 12 FOR N=0 TO 19 ON I,N:=" " NEXT V,N
130 FOR I=0 TO 2 D=MM2$+I IF D=1 THEN NEXT A ELSE T1$=FOR A=0 TO MM1$-1 TO 3 ST
D=1 T1$=T1$+A$ D=MM1$-1,Y,I$ NEXT Y MM1$=MM1$-1
140 END
150 F=9 POP (I+1 TO P+1)
160 IF LEN(W1$)>1000 LEN(W1$) I+1,1 THEN 160
170 T1$=MM1$-1 MM1$=MM1$+I-1 MM1$=I-1 F=I
180 MM1$=I-1 IF F=1 THEN MM1$=1 GOTO 150
190 FOR Y=1 TO 2
200 D=MM2$+I$ G1$=G2$ 490 500 570 610
210 MM1$=I

```



```

228 M=2
229 P=0 FOR I=1 TO N-1
230 IF S(I)<=S(I+1) THEN 260
231 T=S(I) IZ S(I)=S(I+1) S(I+1)=T P=1
232 NEXT I IF P=1 THEN M=M+1 GOTO 238
233 FOR R=0 TO 12 FOR C=0 TO 19 IF S(M,R,C)<=0 THEN G(R,C)=CHR(M) M=M+1:G(R,C)=
234 HEAT C,R
235 FOR R=0 TO 19
236 FOR C=0 TO 19
237 G(R,C)=G(R,C)+1
238 NEXT C R
239 CLS PRINT " PREPARE PRINTER" SOUND 150,50
240 PRINT P=2,CHR(14) PRINT P=2,STP(HKEYS,"")>THIS PRINT P=2,CHR(15)
241 T=INT(R/5) IF T>25 THEN T=25
242 FOR X=1 TO T
243 PRINT P=2,S(S(X),S(X),0),S(S(X+1),S(X+1),0),S(S(X+2),S(X+2),0)
244 NEXT X
245 PRINT P=2,RIGHT(S(25),2)
246 FOR R=0 TO 19 P=R+40+C P=C: NEXT C
247 PRINT P=2,STRTRIM(10,"0")>P
248 NEXT R
249 CLS INPUT " ANOTHER COPY (Y/N) ",R
250 IF R="Y" THEN PRINT P=2,CHR(13):PRINT P=2,CHR(10):GOTO 240
251 IF R="N" THEN END
252 GOTO 450
253 REM(R 20)=1 C=RND(28-10)+10:Y=1
254 FOR Y=1 TO LENGTH(R) IF MID(R,Y,1)<=1 THEN NEXT Y ELSE IF G(R,Y,C(X))<=0 AND G(R,Y,C(X)+1)>0 AND G(R,Y,C(X)+2)>0 THEN 256 ELSE G(R,Y,C(X)+1)=1:G(R,Y,C(X)+2)=1:G(R,Y,C(X)+3)=1:HEAT Y
255 FOR Y=1 TO LENGTH(R) IF G(R,Y,C(X))>0 AND G(R,Y,C(X)+1)>0 AND G(R,Y,C(X)+2)>0 THEN 256 ELSE G(R,Y,C(X)+1)=1:G(R,Y,C(X)+2)=1:HEAT Y
256 RETURN
257 REM(R 20)=10+LEN(R)-1 C=RND(28-10)+10:Y=1
258 REM(R 20)=10+LEN(R)-1 C=RND(28-10)+10:Y=1
259 FOR Y=1 TO LENGTH(R) IF MID(R,Y,1)<=1 THEN NEXT Y ELSE IF G(R,Y,C(X))<=0 AND G(R,Y,C(X)+1)>0 AND G(R,Y,C(X)+2)>0 THEN 260 ELSE G(R,Y,C(X)+1)=1:G(R,Y,C(X)+2)=1:G(R,Y,C(X)+3)=1:HEAT Y
260 FOR Y=1 TO LENGTH(R) IF MID(R,Y,1)<=1 THEN NEXT Y ELSE G(R,Y,C(X))=1:HEAT Y
261 RETURN
262 REM(R 20)=28-LEN(R)-Y+1 C=80-RND(28-LEN(R)-Y+1)+1
263 REM(R 20)=28-LEN(R)-Y+1 C=80-RND(28-LEN(R)-Y+1)+1
264 REM(R 20)=28-LEN(R)-Y+1 C=80-RND(28-LEN(R)-Y+1)+1
265 FOR Y=1 TO LENGTH(R) IF MID(R,Y,1)<=1 THEN NEXT Y ELSE IF G(R,Y,C(X))<=0 AND G(R,Y,C(X)+1)>0 AND G(R,Y,C(X)+2)>0 THEN 266 ELSE G(R,Y,C(X)+1)=1:G(R,Y,C(X)+2)=1:HEAT Y
266 RETURN

```

Slow down your listing speed

How to Evaluate an Argument

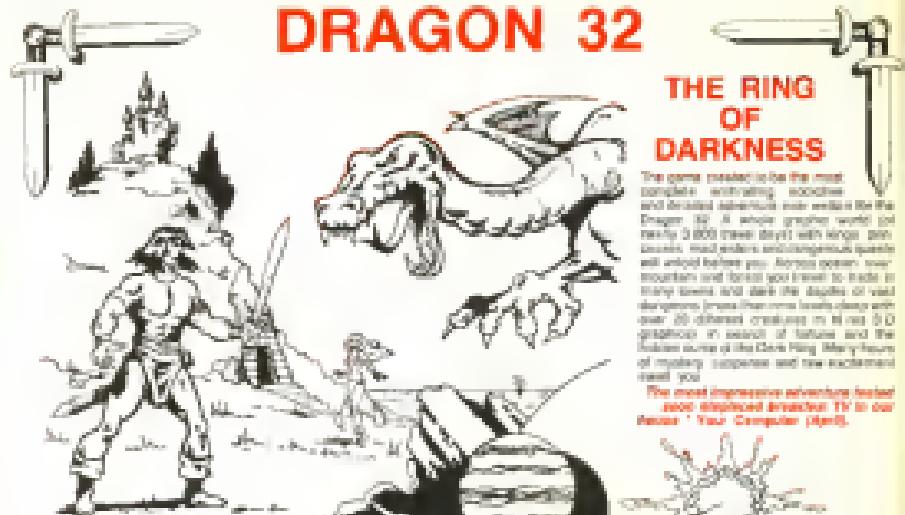
Congratulations! You have saved the earth. Your final score was -13,750 - clearly my score was being tampered with. Not for the first time (and I regret this). Oregon's supercharged LIST which forced another listing about breaks in attempting continental flight!

My own interest in a solution to this problem stemmed from an article in the American magazine *Rainbow* in February which offered a joystick controlled variable speed later for the Tandy Color Computer - a machine not unlike the Dragon 32. The machine does not have a

several ROM-cards which were machine-dependent. (Refer to 20-307-4)

But a recent article in *Popular Computing* briefly revisited my interest. In the reference was made to location 204 who said: "I was as per the 'post to address' system. I recall that this was one of the 8080's requirements restricting my previous designs. With the location entered, many amendments to the joystick address, see it was complete. The finished routine controls the speed of issuing me the right position, and as it creates a delay before printing characters to the screen should also improve its main function."

DRAGON 32



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Merging made easy

MERGING PROGRAMS can be done more easily than in the method given in the August issue of Dragon User. It can be done in a few simple steps:

- 1 LOAD A
- 2 POKC 25 POKC25
- 3 POKC 25 POKC2512
- 4 LOAD B
- 5 RETURN so that A starts after program B
- 6 POKC 25 POKC25
- 7 You now have program B so that it starts after program A. Alternatively the last program may not just tag behind in other. The result is a POKC 25.
- 8 POKC 25 is not serving a purpose of its own so remove. This could be useful for loading in batches at the beginning of a cassette of programs.
- 9 POKC 25 is removed on cassette
- 10 CS AVENUE 16.8KHz
- 11 1204 1525 1524

To load it back just simply use CS/AVENUE.

Programs in the beginning you type POKC 252512. You can also type just POKC 252512. This could be used to divide the tape-program in a program when corrections are being made and to merge it again when an error is required.

Adrian Radayka
Linton, Cumbria

Graphics on tape

AS COMM graphics can easily take over 10 minutes to be drawn. I thought it would be much harder to be able to save them on tape so that they can be replaced instantly in a fraction of the time. My method is based upon the COMM/8 command described in the August. The graphic pages for the Dragon 32 are at the following locations:

Page 1	new location 1600-1647
Page 2	1650-1717
Page 3	1720-1739
Page 4	1740-1757
Page 5	1760-1787
Page 6	1790-1817
Page 7	1820-1847
Page 8	1850-1877
Page 9	1880-1907
Page 10	1910-1937
Page 11	1940-1967
Page 12	1970-1997
Page 13	2000-2027
Page 14	2030-2057
Page 15	2060-2087
Page 16	2090-2117
Page 17	2120-2147
Page 18	2150-2177
Page 19	2180-2207
Page 20	2210-2237
Page 21	2240-2267
Page 22	2270-2297
Page 23	2300-2327
Page 24	2330-2357
Page 25	2360-2387
Page 26	2390-2417
Page 27	2420-2447
Page 28	2450-2477
Page 29	2480-2507
Page 30	2510-2537
Page 31	2540-2567
Page 32	2570-2597
Page 33	2600-2627
Page 34	2630-2657
Page 35	2660-2687
Page 36	2690-2717
Page 37	2720-2747
Page 38	2750-2777
Page 39	2780-2807
Page 40	2810-2837
Page 41	2840-2867
Page 42	2870-2897
Page 43	2900-2927
Page 44	2930-2957
Page 45	2960-2987
Page 46	2990-3017
Page 47	3020-3047
Page 48	3050-3077
Page 49	3080-3107
Page 50	3110-3137
Page 51	3140-3167
Page 52	3170-3197
Page 53	3200-3227
Page 54	3230-3257
Page 55	3260-3287
Page 56	3290-3317
Page 57	3320-3347
Page 58	3350-3377
Page 59	3380-3407
Page 60	3410-3437
Page 61	3440-3467
Page 62	3470-3497
Page 63	3500-3527
Page 64	3530-3557
Page 65	3560-3587
Page 66	3590-3617
Page 67	3620-3647
Page 68	3650-3677
Page 69	3680-3707
Page 70	3710-3737
Page 71	3740-3767
Page 72	3770-3797
Page 73	3800-3827
Page 74	3830-3857
Page 75	3860-3887
Page 76	3890-3917
Page 77	3920-3947
Page 78	3950-3977
Page 79	3980-4007
Page 80	4010-4037
Page 81	4040-4067
Page 82	4070-4097
Page 83	4100-4127
Page 84	4130-4157
Page 85	4160-4187
Page 86	4190-4217
Page 87	4220-4247
Page 88	4250-4277
Page 89	4280-4307
Page 90	4310-4337
Page 91	4340-4367
Page 92	4370-4397
Page 93	4400-4427
Page 94	4430-4457
Page 95	4460-4487
Page 96	4490-4517
Page 97	4520-4547
Page 98	4550-4577
Page 99	4580-4607
Page 100	4610-4637
Page 101	4640-4667
Page 102	4670-4697
Page 103	4700-4727
Page 104	4730-4757
Page 105	4760-4787
Page 106	4790-4817
Page 107	4820-4847
Page 108	4850-4877
Page 109	4880-4907
Page 110	4910-4937
Page 111	4940-4967
Page 112	4970-4997
Page 113	5000-5027
Page 114	5030-5057
Page 115	5060-5087
Page 116	5090-5117
Page 117	5120-5147
Page 118	5150-5177
Page 119	5180-5207
Page 120	5210-5237
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Link your Dragon to the outside world

Gordon Los gives you the chance to win a modem and interface

OF ALL THE choices, why which numbers can be part of the prime numbers must surely be one of the most interesting, mysterious, unusual, unpredictable and quite likely, thought-provoking of them all.

In fact prime numbers are the very basic building blocks of our number system. All numbers are either prime or composite (non-prime) and every integer (whole number) can be broken down into a unique series of prime factors. For example, 108 has the prime factors 10, 3, 2 and 2.

Despite its simple definition — a prime number is a number with no factors other than itself and 1 — there remain many mysteries regarding primes. For centuries mathematicians have endeavoured to find a formula which would generate any prime numbers — and failed.

However, we can state confidently that there are an infinite number of primes.

Not quite so certain is the theory of Chebyshev, who stated that every even number is the sum of two primes. For example, 36 is the sum of 31 and 5. Since 1947, when this conjecture was first disproved, no one has succeeded in

coming up with a proof that this certainly is the case — but on the other hand, no one has been able to discover a single and since when that theorem does not apply.

Below is a simple cross-number grid in which I would like you to fit eight prime 10 digit numbers with numbers can be read in both directions — from left to right and from right to left in the case of the horizontal numbers and from top to bottom and bottom to top in the case of the vertical numbers.

So, for example, if you used the prime 101 you would fit them as follows: 101 will not go into the figure but if do also, you are only allowed to use each digit — once to nine — once and only once. Making this means reverting, reiterations or rotations of the same, and do not count, how many different solutions can you find?



Prizes

THE following OFF the month's price will be awarded to a wide range of telecommunications links to Dragon Users and CP engineers. The two competitions are offering an ideal situation for readers wanting to enter to fit up modems etc using a standard serial standard specifications.

Competitors — which has opened its own Dragon user group at 4, Middle Row, Chipping Norton, Oxfordshire — is asking that the demand for telecommunications technology will grow with its P2000 interface being an essential first step in linking your Dragon to the outside world. With its Communications interface, it was designed by CP Engineering as a small of modems in use on their 1000 range.

The second major reason is to encourage users, both amateur and professional, to explore the facilities available on CP Engineering's 1000 range of computers and answer modems which Competitors will discuss. Other prizes include a 16-bit hard disk from Device which will prevent Dragon users, among whom they're placed, may switch off CP Engineering's 1000 range P2000 and Competitors' 1000, in 1992.

Rules

TO WIN THE modem plus P2000 interface, you have to send in the most imaginative to the public. You must supply both the answer to the competition and how to solve it with the use of a BASIC program developed on your Dragon 30. As a tie-breaker, complete the following sentence in 10 words or less: I want to fit a modem to my Dragon 30 in order to

Each entry must arrive at Dragon User by the last working day in October 1992. The name of the service and the location in the postbox will be printed on the December issue of Dragon User. You may only enter the competition once. Entries will not be acknowledged and no editorial editor will correspond on the first result. Please send your entries to Dragon User, 18/19 Little Newport Street, London WC2R 3LD.

August winner

THE WINNER TO the August competition is that user from page 13 the 1992 200 issue of a perfect square in the following series: 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225, 256, 289, 324, 361, 400, 441, 484, 529, 576, 625, 676, 729, 784, 841, 900, 961, 1024, 1089, 1156, 1225, 1296, 1369, 1444, 1521, 1600, 1681, 1764, 1849, 1936, 2025, 2116, 2209, 2304, 2401, 2500, 2609, 2716, 2824, 2936, 3056, 3176, 3296, 3424, 3556, 3696, 3836, 3984, 4136, 4289, 4444, 4601, 4764, 4929, 5096, 5264, 5436, 5609, 5784, 5961, 6144, 6329, 6516, 6709, 6904, 7109, 7316, 7529, 7744, 7969, 8196, 8429, 8664, 8909, 9156, 9409, 9664, 9929, 10204, 10489, 10784, 11089, 11404, 11739, 12084, 12449, 12824, 13219, 13624, 14049, 14494, 14959, 15434, 15929, 16434, 16959, 17504, 18069, 18654, 19269, 19904, 20579, 21284, 22029, 22804, 23619, 24464, 25349, 26274, 27239, 28244, 29309, 30394, 31519, 32674, 33869, 35104, 36389, 37694, 39039, 40424, 41859, 43334, 44859, 46434, 48059, 49734, 51459, 53234, 55059, 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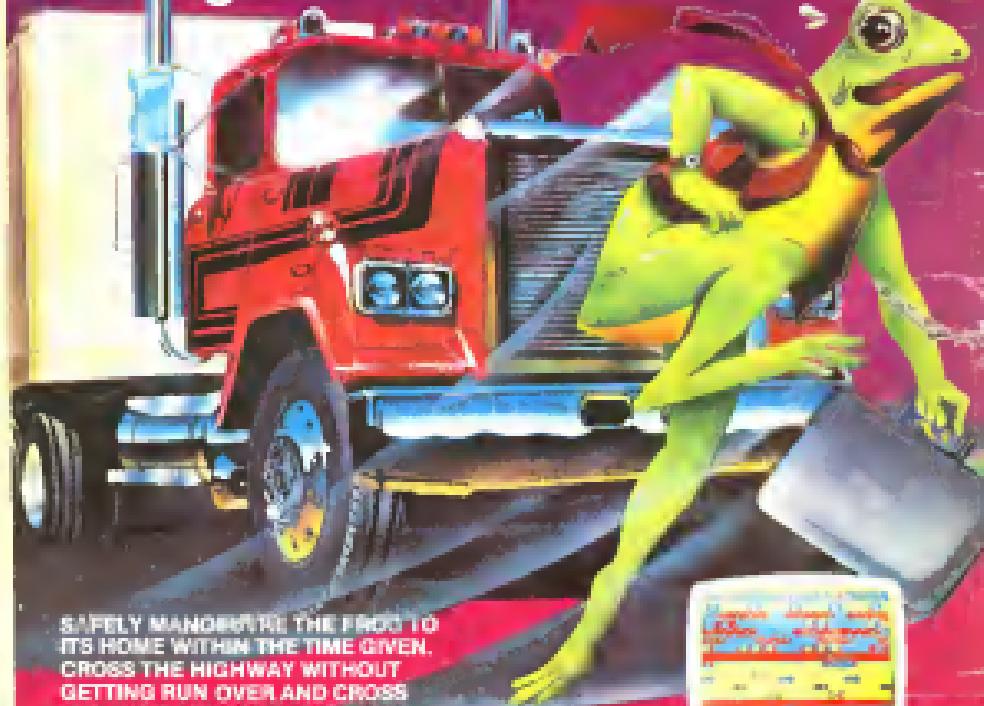
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